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<p>(54) Title: DISPLAY UNIT AND ASSOCIATED SUPPORT ASSEMBLY</p> <p>(57) Abstract</p> <p>Display unit (11) comprising a frame (12) having two major opposed sides and at least one element (16) which defines two oppositely-facing display faces and which is mounted upon the frame (12) for rotation with respect thereto, each display face of the at least one element (16), upon rotation thereof with respect to the frame (12), being viewable alternately from the opposed major sides of the frame (12). A quick-release assembly (2) may be provided for supporting the or each double-sided display element (16) in the frame (12), which assembly (2) facilitates the retention and release of interchangeable elements (16) within the frame (12).</p>		

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DISPLAY UNIT AND ASSOCIATED SUPPORT ASSEMBLYDESCRIPTION

5 This invention relates to a unit for displaying
images and/or articles and is especially, but not
exclusively, related to such a unit for exposing to
view advertising images and/or other information. The
invention is also directed to a support assembly for
10 use with the inventive display unit or other forms of
display unit of the type mentioned above.

Some known types of display unit comprise a
plurality of elongate elements which are rotatable
about respective parallel, longitudinal axes and of
15 which each has three or more, but usually three,
longitudinally-extending faces each bearing indicia
forming part of a complete image defined by a set of
the side-by-side faces facing in the same direction.
Thus, the number of complete images which can be
20 viewed over a period from one side of the display unit
corresponds with the number of faces of each element.
However, these known display units suffer from one
main disadvantage, namely, that only one complete
image can be viewed at any one time and from only one
25 side of the unit.

An object of the invention is to provide a
display unit which overcomes, or at least
substantially reduces, this and other disadvantages
30 associated with known display units of the type in
question.

Accordingly, one aspect of the invention provides
a display unit comprising a frame having two major
35 opposed sides and at least one element which defines

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two oppositely-facing display faces and which is mounted upon the frame for rotation with respect thereto, each display face of the at least one element, upon rotation thereof with respect to the frame, being viewable alternately from the opposed major sides of the frame.

Preferably, the unit comprises a plurality of elements which may be rotatable, in side-by-side relationship, individually or in a given sequence in the same or different directions.

Either or both of the two opposed display faces defined by the or each rotatable element may bear indicia constituting part of a complete image formed when they are viewable, as a set, from each side of the frame on an alternate basis. Alternatively, the display faces of the elements may bear indicia specific to each face.

The faces of the or each element may be provided permanently with indicia, in which case, they may be interchangeable with other elements to alter the display from time to time. Alternatively or additionally, the or each element may be arranged to receive indicia-bearing members on either or both of its display faces, such members being interchangeable if required.

In one embodiment of display unit in accordance with the invention, the or each element is preferably elongate and may be mounted at its opposed longitudinal ends upon opposite edges, preferably the top and bottom edges, of the frame for rotation with respect thereto. In another embodiment, the or each element is arranged to hang from the top edge of the

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frame for rotation with respect thereto. In either embodiment, the or each element may be interchangeable with another or other elements.

5 In a further embodiment of inventive display unit, the length of the frame may be adjustable to accommodate different numbers of elements, depending upon the size of the display required.

10 The inventive display unit may also include a quick-release assembly for supporting the, each or at least one of the elements in the frame, the support assembly comprising a support mounted or arranged to be mounted on the frame and to receive in
15 complementary cooperation therewith an element to be releasably supported by the assembly and a member which is mounted upon the support and which is movable with respect to a so-received element between a locking position in which the element is retained and supported in the frame by the support and a release
20 position in which the element is removable from the support, and hence from the frame, the member being movable reciprocally between said positions by means of a quick release device also mounted on the support.

25 Preferably, the support comprises a channel defined thereby, in which the element to be supported is receivable, with the element retaining/releasing member being movable between its two positions transversely of the channel.

30 In an embodiment of the inventive display unit, the channel of the support is defined between a pair of spaced parallel flanges, preferably depending from a body of the support, in which case, the movable
35 member may comprise a slug, operable by the quick

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release device between its element retaining/release positions. The slug may be slidably mounted in the support, for example, in a throughbore in one of the flanges of the support of the embodiment referred to above. In such an arrangement, one end of the slug
5 may be flush with the inner face of one of the channel-defining flanges, when the slug is in its element-release position, with the slug being movable inwardly of the channel to its element-retaining position, to engage the element. Such engagement may
10 be effected by the one (inner) end of the slug engaging a complementary portion of the element received in the channel and to be supported by the assembly.

15 Preferably, the movable member (slug) is biased outwardly of the channel towards its element-release position by, say, a spring acting between one side of the channel and the member (slug). The spring may be
20 a helical compression spring, in which case, it may be mounted upon an elongate member, such as, a screw or the shank thereof, engaging in a threaded hole provided in said one side of the channel. The other end of the screw can be connected to the quick release
25 device which may comprise a cam arrangement for moving the member (slug) reciprocally between its element retaining/release positions. Such cam arrangement may include a lever operably connected to the movable member via, say, a camming pin. In a preferred
30 embodiment to be described hereinbelow, the head of a screw upon whose shank the movable member is slidably mounted, is located within a generally U-shaped recess in one end of the operating lever, with the camming pin passing through the screw head and also a collar through which the screw shank extends. In this
35 arrangement, rotation of the operating lever causes

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the camming pin to move the collar towards the element receiving channel and, as a consequence, the movable member (slug) into its element-retaining position. Such member is preferably slidably mounted upon the shank of the screw.

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The support assembly may also comprise at least one header bar attached or attachable to the edge of the element to be received by the support. In such a case, the or one of the header bars may be provided with a slot having an enlarged portion for receiving the movable member when the latter is in its element-retaining position.

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In an alternative arrangement for the quick-release support assembly, the movable member may comprise a shaft operable between the respective element retaining and release positions. The shaft may be slidably mounted in respective co-axially aligned bores in the flanges of the support on opposed sides of the element receiving channel defined therebetween, so that the shaft is slidably movable transversely of the channel between the respective element retaining and release positions of the support assembly. One end of the shaft may be received in a blind bore in one of the support flanges, with a compression spring acting between that shaft end and the blind end of the bore, whilst the other end of the shaft preferably protrudes from the open end of the other bore (throughbore) remote from the other end of that bore which is in the other support flange, which opens into the channel and which is coaxially aligned with the open end of the blind bore also opening into the channel.

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The shaft may have respective smaller and larger

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diameter portions operably in the channel between the two flanges of the support for receiving, retaining and/or releasing an element therein.

5 In the element receiving and releasing position of the support assembly, the shaft may be depressed inwardly against the bias of the compression spring, such that the smaller diameter portion of the shaft extends transversely across the channel between the two flanges of the support, to enable that smaller
10 diameter portion to engage in a correspondingly-dimensioned slot in the element to be supported in the frame. Upon release of the shaft, it moves outwardly of the support under the bias of the compression spring, such that its larger diameter portion can be
15 received in a correspondingly-dimensioned aperture, preferably circular, in the element, thereby retaining the element in the channel so that it is supported by the assembly and, hence, within the frame. To release the element from the support assembly, the shaft is
20 again depressed inwardly of the support against the spring bias to release the larger diameter portion of the shaft from the correspondingly-dimensioned aperture in the element, such that the smaller diameter portion of the shaft can be disengaged from
25 the correspondingly-dimensioned slot in the element, thereby releasing the element from the support channel and, hence, from the assembly. Suitable stop means may be provided on the support, such as between the shaft and open-ended bore in the other flange, to
30 limit further outward movement of the shaft in its outwardly, element-retaining position.

Again, the support assembly may also comprise at least one header bar attached or attachable to the
35 edge of the element to be received by the support

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assembly. In this particular case, the in-register correspondingly-dimensioned slot and aperture for receiving the respective smaller and larger diameter portions of the shaft, may be provided in that header bar.

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Also, the display unit may comprise a stationary display and/or a programmable control unit for maintaining one or more of the elements stationary whilst the remaining element(s) is/are rotated synchronously in any given sequence and/or direction, depending upon operating requirements.

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Alternatively or additionally, such a control unit may be programmed to operate a lighting system installed in the frame, or otherwise associated with, the display, to provide illumination synchronised with a given element rotation sequence.

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Also, the programmable control unit may be used to rotate at least one of the elements and/or operate any associated lighting system in any desired synchronous manner with a display external of the inventive display unit, such an external display being, say a moving visual message. Alternatively or additionally, such controlled rotation of the elements and/or synchronous operation of any associated lighting system using the programmable control unit, may be in combination with an audible message generated either by the display unit itself or externally thereof.

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A safety feature might be incorporated into the inventive display unit, whereby any motor, which may be included in the display unit, for rotating the element(s) is switched off if the or one or more of

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the elements becomes jammed for whatever reason. Such a safety cut-out might be of the thermal type, whereby when the motor is still switched on but undergoes any overheating, due to the or one or more of the elements becoming jammed, the resistance of the motor increases
5 due to overheating and such increase in resistance is detected by a suitable electronic circuit which then switches off the motor. An audible or visual alarm may also be provided to operate when the motor is switched off in such a manner.

10

It is another object of the invention to provide a quick-release support assembly for use not only with display units in accordance with the first aspect of the invention but also in other applications in which
15 an element, and preferably generally a planar element, can be interchanged, which assembly overcomes, or at least substantially reduces, the disadvantages associated with known support assemblies.

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Thus, a second aspect of the invention resides in a quick-release, support assembly comprising a support arranged to receive in complementary cooperation therewith an element to be releasably supported by the assembly and a member which is mounted upon the
25 support and which is movable with respect to a so-received element between a locking position in which the element is retained and supported by the support and a release position in which the element is removable from the support, the member being movable
30 reciprocally between said positions by means of a quick release device mounted on the support.

Preferably, the support comprises a channel defined thereby, in which the element to be supported
35 is receivable, with the element retaining/releasing

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member being movable between its two positions transversely of the channel.

5 In an embodiment of the inventive assembly, the channel of the support is defined between a pair of spaced parallel flanges, preferably depending from a body of the support, in which case, the movable member may comprise a slug, operable by the quick release device between its element retaining/release positions. The slug may be slidably mounted in the support, for example, in a throughbore in one of the flanges of the support of the embodiment referred to above. In such an arrangement, one end of the slug may be flush with the inner face of one of the channel-defining flanges, when the slug is in its element-release position, with the slug being movable inwardly of the channel to its element-retaining position, to engage the element. Such engagement may be effected by the one (inner) end of the slug engaging a complementary portion of the element received in the channel and to be supported by the assembly.

25 Preferably, the movable member (slug) is biased outwardly of the channel towards its element-release position by, say, a spring acting between one side of the channel and the member (slug). The spring may be a helical compression spring, in which case, it may be mounted upon an elongate member, such as, a screw or the shank thereof, engaging in a threaded hole provided in said one side of the channel. The other end of the screw can be connected to the quick release device which may comprise a cam arrangement for moving the member (slug) reciprocally between its element remaining/release positions. Such cam arrangement may include a lever operably connected to the movable

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element via, say, a camming pin. In a preferred embodiment to be described hereinbelow, the head of a screw upon whose shank the movable member is slidably mounted, is located within a generally U-shaped recess in one end of the operating lever, with the camming
5 pin passing through the screw head and also a collar through which the screw shank extends. In this arrangement, rotation of the operating lever causes the camming pin to move the collar towards the element receiving channel and, as a consequence, the member
10 (slug) into its element-retaining position. Such member is preferably slidably mounted upon the shank of the screw.

The inventive support assembly may also comprise
15 at least one header bar attached to the edge of the element to be received by the support. In such a case, the or one of the header bars may be provided with a slot having an enlarged portion for receiving the movable member when the latter is in its element-
20 retaining position.

In another arrangement of embodiment for the quick-release support assembly, the movable member may comprise a shaft operable between the respective
25 element retaining and release positions. The shaft may be slidably mounted in respective co-axially aligned bores i n the flanges of the support on opposed sides of the element receiving channel defined therebetween, so that the shaft is slidably movable
30 transversely of the channel between the respective element retaining and release positions of the support assembly. One end of the shaft may be received in a blind bore in one of the support flanges, with a compression spring acting between that shaft end and
35 the blind end of the bore, whilst the other end of the

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5 shaft preferably protrudes from the open end of the other bore (throughbore) remote from the other end of that bore which is in the other support flange, which opens into the channel and which is coaxially aligned with the open end of the blind bore also opening into the channel.

10 The shaft may have respective smaller and larger diameter portions operably in the channel between the two flanges of the support for receiving, retaining and/or releasing an element therein.

15 In the element receiving and releasing position of the support assembly, the shaft may be depressed inwardly against the bias of the compression spring, such that the smaller diameter portion of the shaft extends transversely across the channel between the two flanges of the support, to enable that smaller diameter portion to engage in a correspondingly-dimensioned slot in the element to be supported in the frame. Upon release of the shaft, it moves outwardly of the support s under the bias of the compression spring, such that its larger diameter portion can be received in a correspondingly-dimensioned aperture, preferably circular, in the element, thereby retaining the element in the channel so that it is supported by the assembly and, hence, within the frame. To release the element from the support assembly, the shaft is again depressed inwardly of the support against the spring bias to release the larger diameter portion of the shaft from the correspondingly-dimensioned aperture in the element, such that the smaller diameter portion of the shaft can be disengaged from the correspondingly-dimensioned slot in the element, thereby releasing the element from the support channel and, hence, from the assembly. Suitable stop means

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may be provided on the support, such as between the shaft and open-ended bore in the other flange, to limit further outward movement of the shaft in its outwardly, element-retaining position.

5 Again, the support assembly may also comprise at least one header bar attached or attachable to the edge of the element to be received by the support assembly. In this particular case, the in-register
10 correspondingly-dimensioned slot and aperture for receiving the respective smaller and larger diameter portions of the shaft, may be provided in that header bar.

15 Other embodiments may comprise various combinations of the display unit in accordance with the first aspect of the invention define above and quick release support in accordance with the second
20 aspect of the invention defined above and/or any of the respective modifications thereof as described above.

25 In order that the various aspects of the invention may be more fully understood, embodiments in accordance with the invention will now be described by way of example and with reference to the accompanying
30 drawings in which;

35 Figure 1A and 1B are respective elevational views of a first embodiment of display unit, in accordance with the first aspect of the invention, shown diagrammatically;

 Figure 1C is a perspective view of the display unit of Figures 1A and 1B but with indicia received
thereon;

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Figure 2 is an elevational view of a second embodiment of display unit which, in accordance with the first aspect of the invention, is also shown diagrammatically but which is a modification of the first embodiment of display unit of Figures 1A and 1C;

Figure 3 is an elevational view, again diagrammatic, of a third embodiment of display unit in accordance with the first aspect of the invention.

Figure 4A and 4B are respective elevational views of a fourth embodiment of display unit in accordance with the first aspect of the invention;

Figure 5 is an exploded, perspective view of a first embodiment of quick-release support assembly in accordance with the second aspect of the invention;

Figure 6 is an exploded, perspective view of a quick-release device used in the assembly shown in Figure 5;

Figure 7A 7B and 7C are respective front, side and bottom plan view of a second embodiment of quick-release support assembly in accordance with the second aspect of the invention;

Figure 8 is a side view of an operating shaft used in the support assembly shown in Figures 7A to 7C;

Figure 9A, 9B and 9C are respective front, top plan and side views of a header bar for use with the support assembly shown in Figures 7A to 7C; and

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Figure 10 is a perspective view of the second embodiment of support assembly and header bar shown in Figures 9A to 9C.

Referring firstly to Figures 1A and 1B of the drawings, a first embodiment display unit, shown generally at 11 and in accordance with the first aspect of the invention, comprises a generally rectangular frame 12 having opposed side edges 13 and top and bottom edges 14,15. Four elements, in the form of vanes 16, are mounted at 17 and 18, respectively, upon the top and bottom edges 14,15 of the frame 12 by means of clips. Either or both of the clips 17,18 of each vane 16 is/are drivable by an electric motor (not shown) housed in the frame, to rotate each vane 16 through 180°, at given intervals, about its longitudinal axis with respect to the frame. Each vane 16 defines a pair of opposed display faces which can be viewed alternately from each of the two sides of the frame 12, after each 180° rotation of the vane.

In this embodiment, as shown in Figure 1B, adjacent vanes 16 are rotatable with respect to the frame 12 in opposite directions.

As can be seen from Figure 1C, each double-face vane 16 is provided with an array of studs 19 on each of its two display faces (only one shown), for detachably receiving respective members in the form of cards 20, 20', 20'' bearing informational indicia. These cards 20, 20', 20'' are interchangeable with other cards for altering the informational indicia displayed by the unit 11, the vanes 16 being mounted permanently upon the frame 12. Alternatively, the vanes 6A may also be interchangeable and, thus,

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detachable from the frame 12.

Thus, after each 180° rotation of the vanes 16, the indicia on the cards 20, 20', 20'' can be viewed alternately from each side of the unit 11.

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A second embodiment of display unit in accordance with the first aspect of the invention, is shown generally in Figure 2, wherein the vanes 26 are again mounted upon the top and bottom edges 24,25 of the frame 22 by means of rotatably driven clips 27,28. However, in this embodiment, the clips 27,28 are arranged to rotate all the vanes 26 in the same direction.

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As in the case of the first embodiment of display unit described above with reference to Figures 1A to 1C, each vane 26 may be arranged to receive interchangeable indicia-bearing members and/or may bear such indicia on its opposite display faces and, again, the vanes may be interchangeable with other vanes bearing different indicia in order to alter the display borne by the unit 21.

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In Figure 3, there is shown a third embodiment of display unit 31 in accordance with the first aspect of the invention, wherein only the top of each vane 36 is mounted at 37 to the frame 32 at the top edge 34 thereof, that is to say, each vane 36 is suspended therefrom. However, each suspension clip 37 is again rotatably driven, to rotate the vanes 36 through sequential 180° steps such that the indicia borne by the or each display face of each vane can be viewed alternately from each side of the unit frame 32.

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In Figures 4A and 4B, there is shown a fourth

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embodiment of display unit 41 in accordance with the first aspect of the invention, wherein again only the top of each vane 46 is suspended at 47 from the frame 42 at the top edge 44 thereof. However, the bottom of each vane 46 is retained rotatably at 48.

5

Each suspension clip 47 is again rotatably driven, to rotate the vanes 46 through sequential 180° steps, such that the indicia borne by the or each display face of each vane can be viewed alternately from each side of the unit frame 42, as shown in Fig 4A. In Figure 4B, the vanes 46 are shown as having been rotated through a quarter (90°) turn.

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In each of the embodiments of display unit 11,21,31,41 described above with reference to the drawings, the vanes 16,26,36,46 are rotated in sequence in either or both directions in any combination, for example individually, and may be maintained in each of the two viewing orientations for any predetermined length of time.

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It is to be appreciated that the generally planar shape of the inventive display unit 11,21,31,41 reduces the amount of space which it occupies, whilst permitting the indicia borne by either or both display faces of the vanes 16,26,36,41 to be viewed alternately from each side of the unit.

25

Further, the units 11,21,31,41 may be modular, in which case, they can be arranged in side-by-side relationship to alter the size (length) of the display.

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Moreover, the display faces of the vanes 16,26,36,46 may be used to display articles, rather

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than indicia, in which case, they may be modified with suitable supports for the articles to be displayed.

Furthermore, and as indicated above, the display unit may be provided with a stationary display and/or
5 a programmable control unit (not shown) for maintaining one or more of the vanes 16,26,36,46 stationary whilst the remaining vanes are rotated in any given sequence and/or direction, depending upon requirements.

10

Alternatively or additionally, such a control unit may be programmed to operate in any desired sequence a lighting system (also not shown) installed in or associated with the frame 12,22,32,42 to provide
15 an illumination effect synchronised with a given vane rotation sequence.

Also, the programmable control unit may be used to rotate at least one of the vanes 16,26,36,46 and or
20 operate the associated lighting system in any desired synchronous manner with a display external of the inventive display unit 11,21,31,41, such an external display being, say, a moving visual message. Alternatively or additionally, such controlled
25 rotation of the vanes 16,26,36,46 and/or synchronous operation of any associated lighting system using the programmable control unit may be in combination with an audible message generated by either the display unit itself or externally thereof.

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A safety feature could be incorporated into the inventive display unit 11,21,31,41, whereby the motor(s) for rotating the vanes 16,26,36,46 is/are cut-out if one or more of the vanes becomes jammed for
35 whatever reason. Such a safety cut-out might be of

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the thermal type, whereby when the motor(s) is stopped but is still switched on, due to one or more of the vanes 16,26,36,46 becoming jammed, the resistance of the motor increases due to overheating and such increase in resistance is detected by a suitable
5 electronic circuit which then switches off the motor.

Referring now to Figures 5 and 6 of the drawings, an interchangeable vane 1 which can be rotatably supported in a display unit, such as any of those
10 described above in relation to Figures 1 to 4 of the drawings, and which bears, say, promotional matter on at least one of its two opposed faces, is so supported at its upper edge, and possibly also at its lower edge, by a first embodiment quick release assembly in
15 accordance with the second aspect of the invention, as indicated generally at 2.

The quick release support assembly 2 comprises a pair of header bars 3, 4 clamped to respective opposed
20 faces of the vane 1 at the upper edge 5 thereof by means of in register holes 6, 7 in the vane and the bars and through screws (not shown). Thus, the upper edge 5 of the vane 1 is clamped firmly between the pair of header bars 3, 4.
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The header bar 3 has a narrow, open-ended slot 8 extending downwardly from its upper edge, whilst the vane 1 has a similar, but wider, open-ended slot 9 in its upper edge. The header bar 4 also has an open-
30 ended slot 10 extending downwardly from its upper edge but having an enlarged portion 11 of generally circular section at its lower end. All three slots 8, 9, 10 lie in general register with each other when the header bars 3, 4 are clamped to the upper edge 5 of
35 the vane 1.

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The assembly 2 also comprises a quick release support, indicated generally at 120, which is mounted rotatable in a bearing (not shown) of the display unit by means of a vertical shaft 121, and a generally circular body 122 having a pair of spaced parallel flanges 123, 124 depending vertically downwardly from the lower face of the body 122 to define a channel 125 therebetween. The width of the channel 125 is just slightly greater than the combined thicknesses of the pair of header bars 3, 4 and the upper edge of the vane 1 when those three latter components are clamped firmly together.

The flange 123 has a threaded hole 126 provided in its inner face, whilst the other flange 124 has a circular throughbore 127 of larger diameter than the hole 126 and in axial alignment therewith.

A quick release latch, indicated generally at 130 in Figure 5 but shown in greater detail in Figure 6, comprises an operating lever 131, a cammed pin 132, a locating screw 133, a generally U-shaped retaining collar 136, a cylindrical slug 138 and a helical compression spring 140.

When the quick release latch 130 is assembled, as shown in Figure 5, the U-shaped collar 136 is located in a generally U-shaped recess 141 in the forward end of the operating lever 131, with the head 134 of the screw 133 located between the arms of the U-shaped collar 136 and with the shank 135 of the screw 133 extending through a hole 137 in the forward base end of the collar 136. These three components, namely, the operating lever 131, the locating screw 133 and the U-shaped collar 136, are held together by the cammed pin 132 which is received in respective pairs

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of holes 141' and 136' in the arms of the U-shaped recess 141 of the operating lever 131 and the arms of the U-shaped collar 136 and also in a hole 133' in the head 134 of the screw 133. The opposed ends of the cammed pin 132 are retained rigidly in their
5 respective holes 141', whilst the central shank of the pin 132 is freely rotatable with respect to the collar 136 and screw head 134.

Also, the threaded shank 135 of the screw 133
10 passes through an axial bore 139 in the slug 138 and axially through the compression spring 140.

The assembled latch 130 can be presented to the support 120 such that the free end of the screw 133
15 and associated spring 140 thereon pass through the larger diameter throughbore 127 in the flange 124 and that end of the screw 133 is received in the threaded hole 126 in the flange 123. Then, the latch 130 is
20 rotated as a whole in the direction of the arrow A, so that the screw 133 is threaded into the hole 126. The forward end of the spring 140 abuts the region of the inner face of the flange 123 surrounding the hole 126 such that it is compressed, whilst the forward end
25 face of the slug 138, which is now received within the throughbore 127, lies generally flush with the inner face of the flange 124.

Rotation of the operating lever 131 of the quick
30 release latch 130 in the direction of the arrow B through about 90° urges the slug 138 inwardly of the channel 125 defined by the flanges 123, 124 such that the spring 140 is compressed further, by the action of the rotation of the cammed pin 132 upon the collar 136 which is urged forwardly of the lever 131 and screw
35 133, to move the slug 138 forwardly also.

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Thus, when the upper edge of the vane 1 and the header bars 3, 4 clamped thereto are received within the channel 125 with the in-register slots 8, 9, 10 in alignment with the threaded hole 126 and throughbore 127, the slug 138 is urged into the enlarged portion 11 of the slot 10 of the bar 4, to lock the assembly together.

The assembly 3 and associated vane 1 can then be mounted readily in the associated display unit.

Quick release of the vane 1 from the support 120, when the former is to be removed for modification or interchanged with another vane, is effected by rotating the lever 131 in the opposite direction to that of arrow B, thus allowing the slug 138 to withdraw from the enlarged portion 11 of the slot 10 in the header bar 4, under the bias of the compressed spring 140, thereby allowing the vane 1 to be released from the support 120.

As indicated above, the vane may be provided with an inventive assembly 2 at each of its upper and lower edges.

Also, the quick release latch 130 may be replaced with any other suitable form of release (quick) mechanism.

Thus, a second embodiment of quick release support assembly is shown in Figures 7 to 10 and comprises a quick release support 220 (Figures 7A to 7C) which is mounted rotatably in a bearing (not shown) of an associated display unit by means of a vertical shaft 221 and has a generally circular body portion 222 having a pair of spaced parallel flange

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portions 223, 224 depending from the body portion 222, to define a channel 225 therebetween. The width of the channel 225 is just slightly greater than the thickness of a generally U-shaped header bar 301 (Figures 9A to 9C) within whose inserted channel 302 is receivable the upper edge of a vane (not shown) of the display unit. Transverse holes 303 and corresponding in-register holes (also not shown) in the upper edge of the vane are arranged to receive complementary fixing means, such as, screws, studs or rivets, for securing the header bar 301 to the vane.

A shaft 338 (Figure 8) comprises a smaller diameter portion 339 and a larger diameter portion 340 which is at one end of the shaft and which has a blind bore 341 for receiving therein a compression spring 342, as shown in Figure 7C.

The shaft 338 is received in respective blind and open ended, coaxially aligned bores 351, 352 in respective ones of the flange portions 223, 224 of the support 220, with the compression spring 342 extending and acting between the bottom of the blind bore 341 in the larger diameter portion 340 of the shaft 338 and the bottom of the blind bore 351 in the flange portion 223 of the support 220, to bias the shaft into the position shown in Figure 7C. Thus, in this position of the shaft 338, which represents the vane-retaining position of the support, respective portions of the smaller and larger diameter portions 339 and 340 of the shaft are located in the channel 225 defined between the flange portions 223, 224 of the support 220.

To place the support 220 in its vane-receiving or release position, the free, enlarged diameter end

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portion 343 of the shaft 338 which projects from the outer open end of the bore 352 in the flange portion 224, is urged inwardly thereof against the bias of the compression spring 342, so that the smaller diameter portion 339 of the shaft 338 extends fully across the channel 225, with the larger diameter portion 340 of the shaft being received fully within the blind bore 351. As a consequence, the header bar 301, now attached to the top edge of a vane of the associated display unit, can be inserted into the support channel 225, such that a correspondingly-dimensioned, open-ended slot 304 in one side arm of the header bar 301 can receive the smaller diameter portion 339 of the shaft 338 therein, so that the header bar 301 fits snugly into the channel 225. On release of the end portion 343 of the shaft 338, the latter is urged outwardly of the support flange portion 224 under the bias of the spring 342, back to the vane-retaining position shown in Figure 7C. In this manner, the portion of the larger diameter portion 340 in the channel 225 engages a correspondingly-dimensioned, circular aperture 305 in the other side arm of the header bar 301, such that the shaft 338, and hence the support 220, is now in its vane-retaining position.

Outward sliding movement of the shaft 338 with respect to the open-ended bore 352 is limited by stop means in the form of a dowel pin 350 which extends transversely and to one side of that open ended bore 352 and, also, engages the outer annular surface of another enlarged diameter portion 344 of the shaft 338, as shown in Figure 7C. Similarly, inward movement of the shaft 338 with respect to the open ended bore 352 is limited by the dowel pin 350 engaging the inner annular surface of the enlarged diameter portion 343 of the shaft 338.

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It is to be appreciated that the embodiment of the inventive display unit and/or quick release support assembly described above with reference to the accompanying drawings, as well as the numerous other embodiments of display unit and/or quick release support assembly in accordance with the two aspect of the invention, provide display units which are comparatively inexpensive to manufacture, are easily maintained and provide double-sided viewing of display material and/or quick release assemblies which facilitate the interchangeability of the display elements (vanes).

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CLAIMS

1. A display unit comprising a frame having two major opposed sides and at least one element which defines two oppositely-facing display faces and which
5 is mounted upon the frame for rotation with respect thereto, each display face of the at least one element, upon rotation thereof with respect to the frame, being viewable alternately from the opposed major sides of the frame.
10
2. A unit according to claim 1 which further comprises a plurality of elements which are rotatable, in side-by-side relationship, individually or in a given sequence in the same or different directions.
15
3. A unit according to claim 1 or 2, wherein either or both of the two opposed display faces defined by the or each rotatable element bears indicia constituting part of a complete image formed when they
20 are viewable, as a set, from each side of the frame on an alternate basis.
4. A unit according to claim 1, 2 or 3, wherein the display faces of the elements bear indicia specific to
25 each face.
5. A unit according to any preceding claim, wherein the faces of the or each element are provided permanently with indicia.
30
6. A unit according to claim 5, wherein the or each element is interchangeable with another element to alter the display.
- 35 7. A unit according to any preceding claim, wherein

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the or each element is arranged to receive indicia-bearing members on either or both of its display faces.

5 8. A unit according to claim 7, wherein the indicia-bearing members are interchangeable.

9. A unit according to any preceding claim, wherein the or each element is elongate.

10 10. A unit according to any preceding claim, wherein the or each element is mounted at opposed ends thereof upon opposite edges of the frame for rotation with respect thereto.

15 11. A unit according to claim 10, wherein the or each element is mounted at its opposed ends upon top and bottom edges of the frame.

20 12. A unit according to any of claims 1 to 9, wherein the or each element is arranged to hang from a top edge of the frame for rotation with respect thereto.

25 13. A unit according to any preceding claim wherein the or each element is interchangeable with another or other elements.

30 14. A unit according to any preceding claim, wherein the length of the frame is adjustable to accommodate different numbers of elements in dependence upon the size of the display required.

35 15. A unit according to any preceding claim further comprising a quick-release, assembly for supporting the, each or at least one of the elements in the frame, the support assembly comprising a support

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mounted or arranged to be mounted on the frame and to receive in complementary cooperation therewith an element to be releasably supported by the assembly and a member which is mounted upon the support and which is movable with respect to a so-received element
5 between a locking position in which the element is retained and supported in the frame by the support and a release position in which the element is removable from the support, and hence from the frame, the member being movable reciprocally between said positions by
10 means of a quick release device also mounted on the support.

16. A unit according to claim 15, wherein the support comprises a channel defined thereby, in which the
15 element(s) to be supported is received or receivable, with the element retaining/releasing member being movable between its two positions transversely of the channel.

20 17. A unit according to claim 16, wherein the channel of the support is defined between a pair of spaced parallel flanges.

25 18. A unit according to claim 17, wherein the flanges depend from a body of the support.

19. A unit according to any of claims 15 to 18, wherein the movable member comprises a slug operable by the quick release device between its element
30 retaining/release positions.

20. A unit according to claim 19, wherein the slug is slidably mounted on the support.

35 21. A unit according to claim 20, wherein the slug is

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slidably mounted in a throughbore in one of the flanges of the support.

22. A unit according to claim 19, 20 or 21, wherein one end of the slug is flush with the inner face of one of the channel-defining flanges, when the slug is in its element-release position, with the slug being movable inwardly of the channel to its element-retaining position, to engage the element.
23. A unit according to claim 22, wherein an inner end of the slug engages a complementary portion of the element received in the channel.
24. A unit according to claim 16, or any of claims 17 to 23 when dependent upon claim 16, wherein the movable member is biased outwardly of the channel towards its element-release position.
25. A unit according to claim 24, wherein the movable member is so-biased by means of a spring acting between one side of the channel and the member.
26. A unit according to claim 25, wherein the spring is a helical compression spring mounted upon an elongate member engaging in a hole provided in said one side of the channel.
27. A unit according to any of claims 15 to 26, wherein the quick release device comprises a cam arrangement for moving the member reciprocally between its element retaining and release positions.
28. A unit according to claim 27, wherein the cam arrangement includes a lever operably connected to the movable member.

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29. A unit according to claim 28, wherein the head of a screw upon whose shank the movable member is slidably mounted, is located within a generally U-shaped recess in one end of the operating lever, with a camming pin passing through the screw head and also
5 a collar through which the screw shank extends.

30. A unit according to claim 29, wherein rotation of the operating lever is arranged to cause the camming pin to move the collar towards the element receiving
10 channel and, as a consequence, the movable member into its element-retaining position.

31. A unit according to claim 29 or 30, wherein the movable member is slidably mounted upon the shank of
15 the screw.

32. A unit according to any of claims 15 to 31, wherein the support assembly also comprises a header bar attached or attachable to the edge of an element
20 to be received by the support.

33. A unit according to claim 32, wherein the header bar is provided with a slot having an enlarged portion for receiving the movable member when the latter is in
25 its element-retaining position.

34. A unit according to claim 15, 16 or 17, wherein the reciprocally movable member of the support assembly comprises a shaft operable between its
30 respective element retaining and release positions.

35. A unit according to claim 34, when dependent upon claim 16 or 17, wherein the shaft is slidably mounted in respective co-axially aligned bores in the flanges
35 of the support on opposed sides of the element

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receiving channel defined therebetween, so that the shaft is slidably movable transversely of the channel between the respective element retaining and release positions.

5 36. A unit according to claim 35, wherein one end of the shaft is received in a blind bore in one of the support flanges, with a compression spring acting between that shaft end and the blind end of the bore.

10 37. A unit according to claim 36, wherein the other end of the shaft protrudes from the open end of the other bore remote from the other end of the other bore which is in the other support flange, which opens into the channel and which is coaxially aligned with the
15 open end of the blind bore opening into the channel.

38. A unit according to any of claims 34 to 37, wherein the shaft has respective smaller and larger diameter portions operable in the channel between the
20 two flanges of the support for receiving, retaining and/or releasing an element therein.

39. A unit according to claim 38, wherein, in the element receiving and release position of the support
25 assembly, the shaft can be depressed inwardly against the bias of the compression spring, such that the smaller diameter portion of the shaft extends transversely across the channel between the two flanges of the support, to enable that smaller
30 diameter portion to engage in a correspondingly-dimensioned slot in an element to be supported in the frame.

40. A unit according to claim 39, wherein, upon
35 release of the shaft, it can move outwardly of the

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support under the bias of the compression spring, such that its larger diameter portion is received in a correspondingly-dimensioned aperture, in the element, thereby retaining the element in the channel so that it is supported by the assembly and, hence, within the frame.

41. A unit according to claim 39 or 40, wherein, in order to release an element from the support assembly, the shaft can be depressed inwardly of the support against the spring bias to release the larger diameter portion of the shaft from the correspondingly-dimensioned aperture in the element, such that the smaller diameter portion of the shaft can be disengaged from the correspondingly-dimensioned slot in the element, thereby releasing the element from the support channel and, hence, from the assembly.

42. A unit according to any of claims 34 to 41, wherein stop means provided on the support, limits further outward movement of the shaft in its outward, element-retaining position.

43. A unit according to any of claims 34 to 42, wherein the support assembly also comprises at least one header bar attached or attachable to the edge of an element received or to be received by the support assembly.

44. A unit according to claim 43, wherein the correspondingly-dimensioned slot and aperture for receiving respective smaller and larger diameter portions of the shaft, are provided in the header bar.

45. A unit according to any preceding claim further comprising a programmable control unit for maintaining

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one or more of the elements stationary whilst the remaining element(s) is/are rotated synchronously in any given sequence and/or direction, depending upon operating requirements.

5 46. A unit according to claim 45, wherein the programmable control unit can be programmed to operate a lighting system installed in the frame, or otherwise associated with the display, to provide
10 illumination synchronised with a given element rotation sequence.

47. A unit according to claim 45 or 46, wherein the programmable control unit is arranged to rotate at
15 least one of the elements and/or operate any associated lighting system in any desired synchronous manner with a display external of the display unit.

48. A unit according to claim 47, wherein the
20 external display is an audio or visual message.

49. A unit according to any preceding claim including a safety arrangement, whereby a motor for rotating the element(s) is arranged to be switched off if the or
25 one or more of the elements becomes jammed.

50. A quick-release support assembly comprising a support arranged to receive in complementary cooperation therewith an element to be releasably
30 supported by the assembly and a member which is mounted upon the support and which is movable with respect to a so-received element between a locking position in which the element is retained and supported by the support and a release position in which the element is removable from the support, the
35 member being movable reciprocally between said

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positions by means of a quick release device mounted on the support.

51. An assembly according to claim 50, wherein the support comprises a channel defined thereby, in which
5 the element to be supported is receivable, with the element retaining/releasing member being movable between its two positions transversely of the channel.

52. An assembly according to claim 51, wherein the
10 channel of the support is defined between a pair of spaced parallel flanges.

53. An assembly according to claim 52, wherein the flanges depend from a body of the support.
15

54. An assembly according to any of claims 50 to 53, wherein the movable member comprises a slug operable by the quick release device between its element retaining/release positions.
20

55. An assembly according to claim 54, wherein the slug is slidably mounted in the support.

56. An assembly according to claim 55, when dependent
25 upon any of claims 52 to 54, wherein the slug is slidably mounted in a throughbore in one of the flanges of the support.

57. An assembly according to claim 54, 55 or 56,
30 wherein one end of the slug is flush with the inner face of one of the channel-defining flanges, when the slug is in its element-release position, with the slug being movable inwardly of the channel to its element-retaining position, to engage the element.
35

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58. An assembly according to any of claims 54 to 57, wherein one end of the slug engages a complementary portion of an element received in the channel and to be supported by the assembly.

5 59. An assembly according to any of claims 51 to 58, wherein the movable member is biased outwardly of the channel towards its element-release position by a spring acting between one side of the channel and the member.

10 60. An assembly according to claim 59, wherein the spring is a helical compression spring mounted upon an elongate member engaged in a hole in said one side of the channel.

15 61. An assembly according to claim 60, wherein the other end of the elongate member is connected to the quick release device.

20 62. An assembly according to any of claims 50 to 61 including a cam arrangement for moving the movable member reciprocally between its element remaining/release positions.

25 63. An assembly according to claim 62, wherein the cam arrangement includes a lever operably connected to the movable element.

30 64. An assembly according to any of claims 50 to 63, wherein the head of a screw upon whose shank the movable member is slidably mounted, is located within a generally U-shaped recess in one end of an operating lever, with a camming pin passing through the screw head and also a collar through which the screw shank
35 extends.

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65. An assembly according to claim 64, wherein rotation of the operating lever is arranged to cause the camming pin to move the collar towards the element receiving channel and, as a consequence, the member into its element-retaining position.

5

66. An assembly according to claim 64 or 65, wherein the movable member is slidably mounted upon the shank of the screw.

10

67. An assembly according to any of claims 50 to 66 which also comprises a header bar attached or attachable to the edge of an element to be received and supported by the support.

15

68. An assembly according to claim 67, wherein the header bar is provided with a slot having an enlarged portion for receiving the movable member when the latter is in its element-retaining position.

20

69. An assembly according to any of claims 50 to 53, wherein the movable member comprises a shaft operable between respective element retaining and release positions.

25

70. An assembly according to claim 69, wherein the shaft is slidably mounted in respective co-axially aligned bores in flanges of the support on opposed sides of an element receiving channel defined therebetween, so that the shaft is slidably movable transversely of the channel between the respective element retaining and release positions.

30

71. An assembly according to claim 69 or 70, wherein one end of the shaft is received in a blind bore in one of the support flanges, with a compression spring

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5 acting between that shaft end and the blind end of the bore, whilst the other end of the shaft protrudes from the open end of the other bore remote from the other end of the other bore which is in the other support flange, which opens into the channel and which is coaxially aligned with the open end of the blind bore opening into the channel.

10 72. An assembly according to any of claims 69 to 71, wherein the shaft has respective smaller and larger diameter portions operable in the channel between the two flanges of the support for receiving, retaining and/or releasing an element therein.

15 73. An assembly according to claim 72, when dependent upon claim 71, wherein, in the element receiving and releasing positions of the support assembly, the shaft can be depressed inwardly against the bias of the compression spring, such that the smaller diameter portion of the shaft extends transversely across the
20 channel between the two flanges of the support, to enable the smaller diameter portion to engage in a correspondingly- dimensioned slot in an element to be supported in the frame.

25 74. An assembly according to claim 73, wherein upon release of the shaft, it can move outwardly of the support under the bias of the compression spring, such that its larger diameter portion can be received in a correspondingly-dimensioned aperture in the element,
30 thereby retaining the element in the channel.

35 75. An assembly according to claim 72, 73 or 74, wherein, in order to release the element from the support assembly, the shaft can again be depressed inwardly of the support against the spring bias to

release the larger diameter portion of the shaft from the correspondingly-dimensioned aperture in the element, such that the smaller diameter portion of the shaft can be disengaged from the correspondingly-dimensioned slot in the element, thereby releasing the element from the support channel and, hence, from the assembly.

76. An assembly according to any of claims 69 to 75 including stop means provided on the support and arranged to limit further outward movement of the shaft in its outward, element-retaining position.

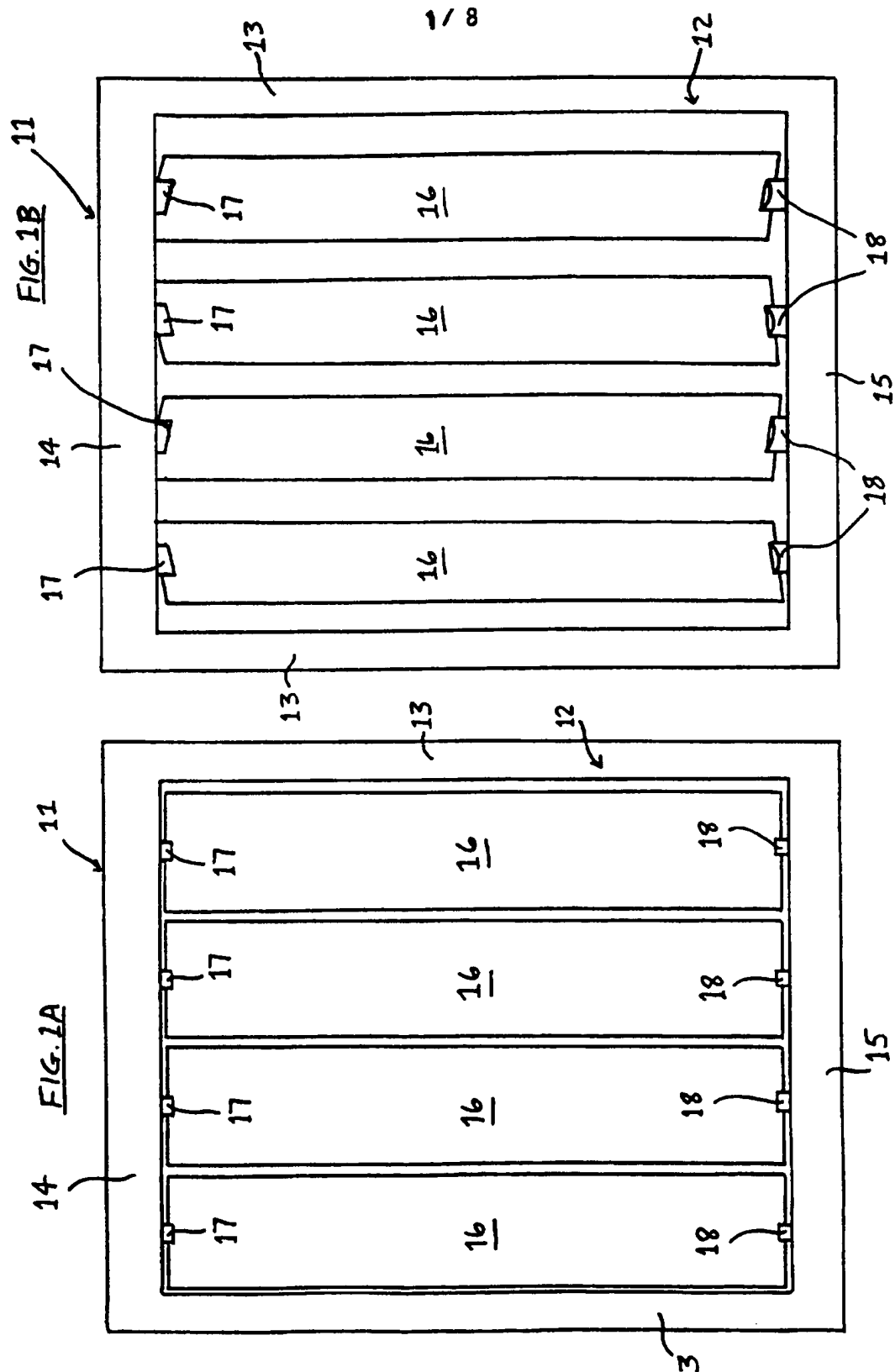
77. An assembly according to any of claims 69 to 76 also comprising a header bar attached or attachable to an edge of an element to be supported by the support assembly.

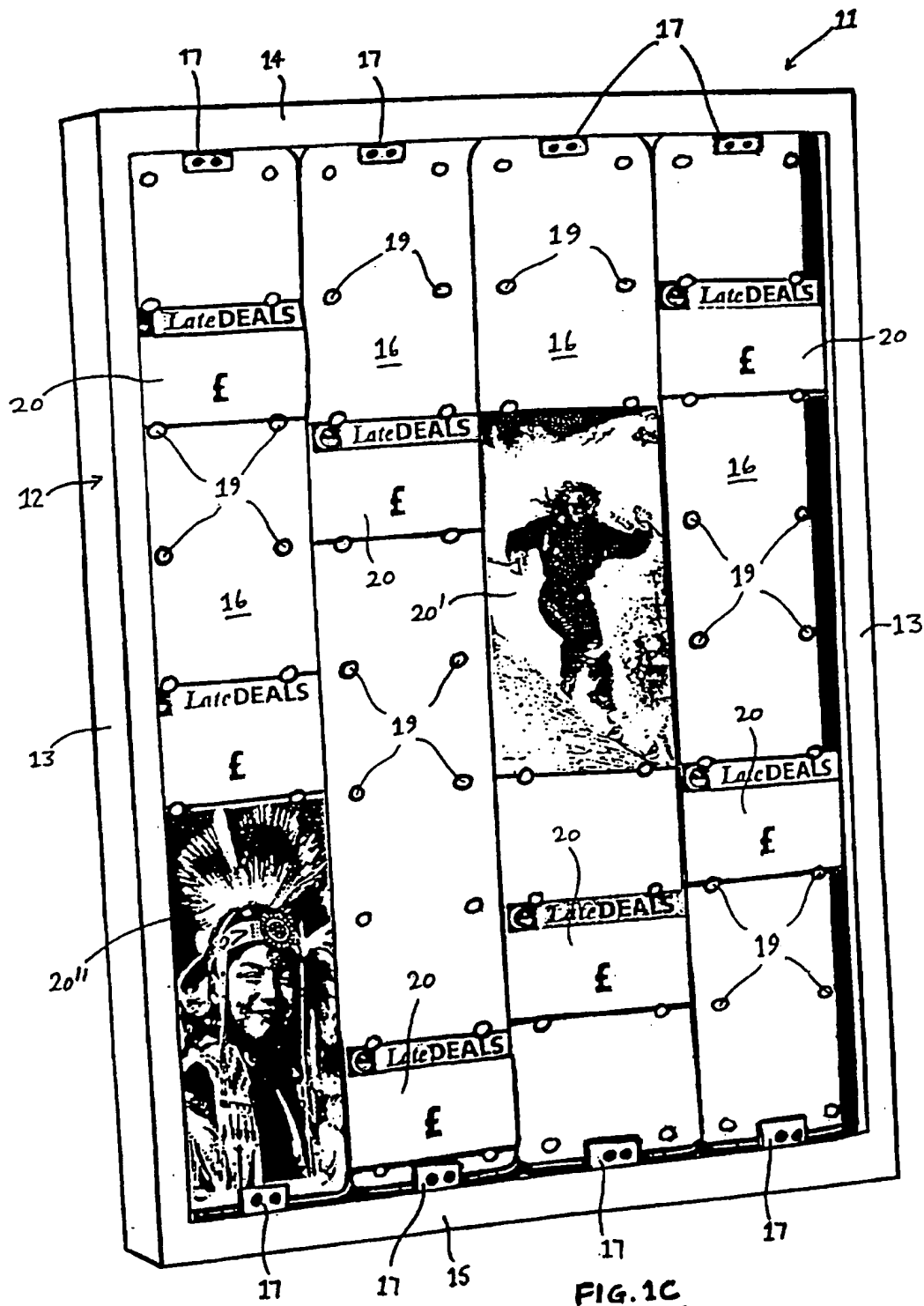
78. An assembly according to claim 77, wherein the header bar includes in-register, correspondingly-dimensioned slot and aperture for receiving the respective smaller and larger diameter portions of the shaft.

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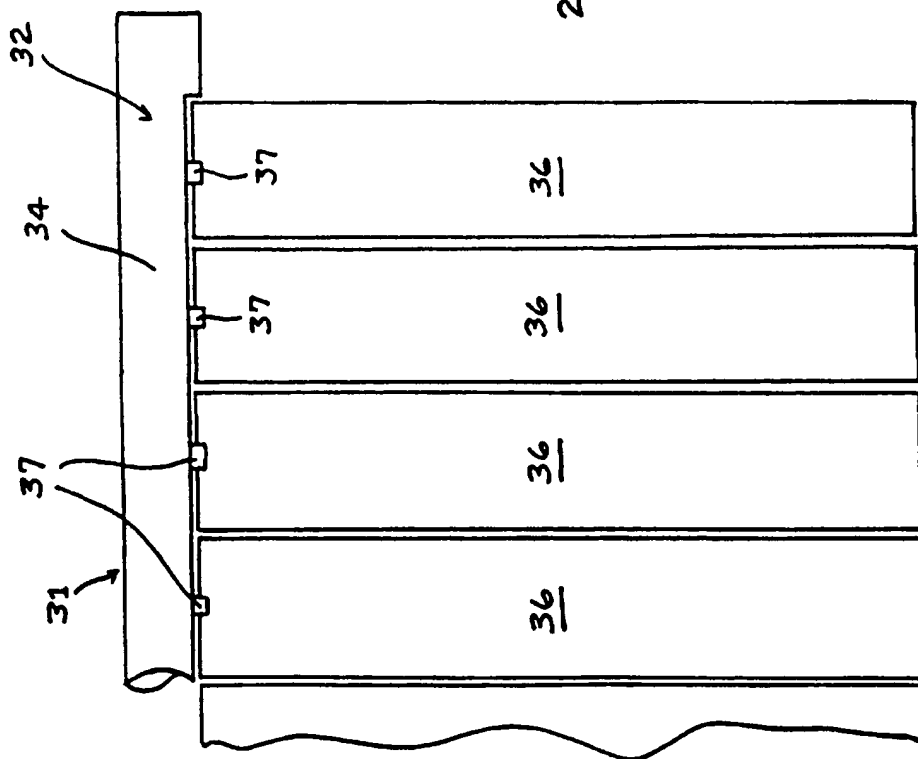
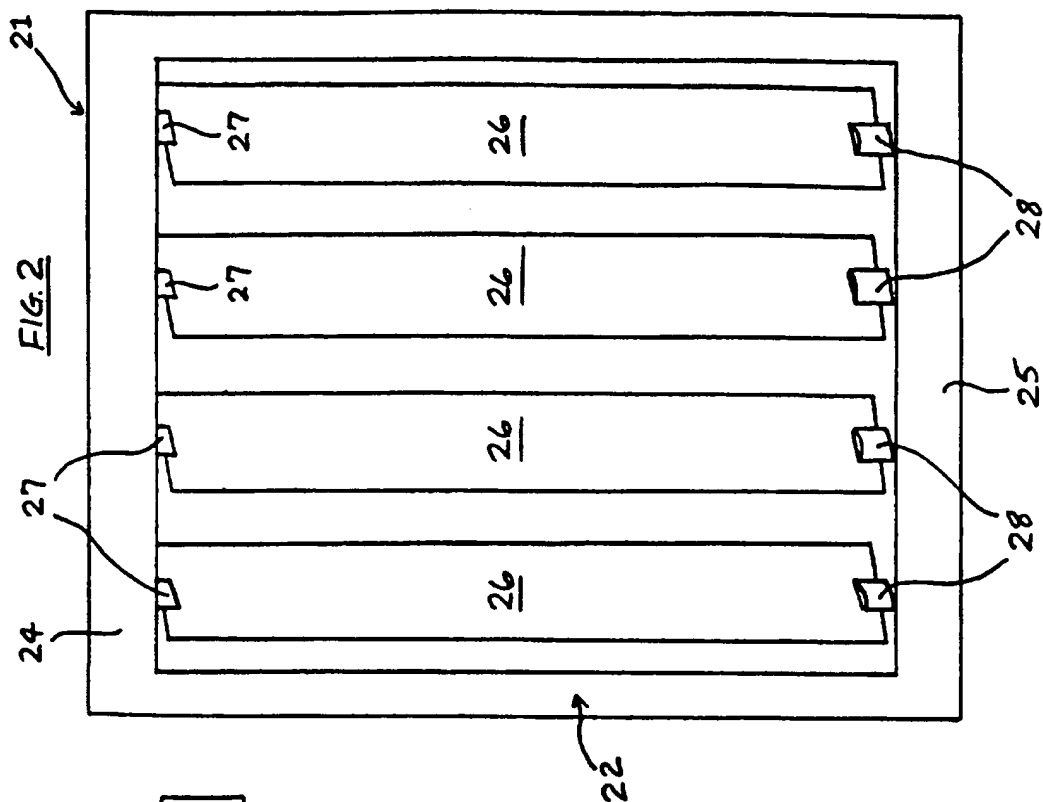
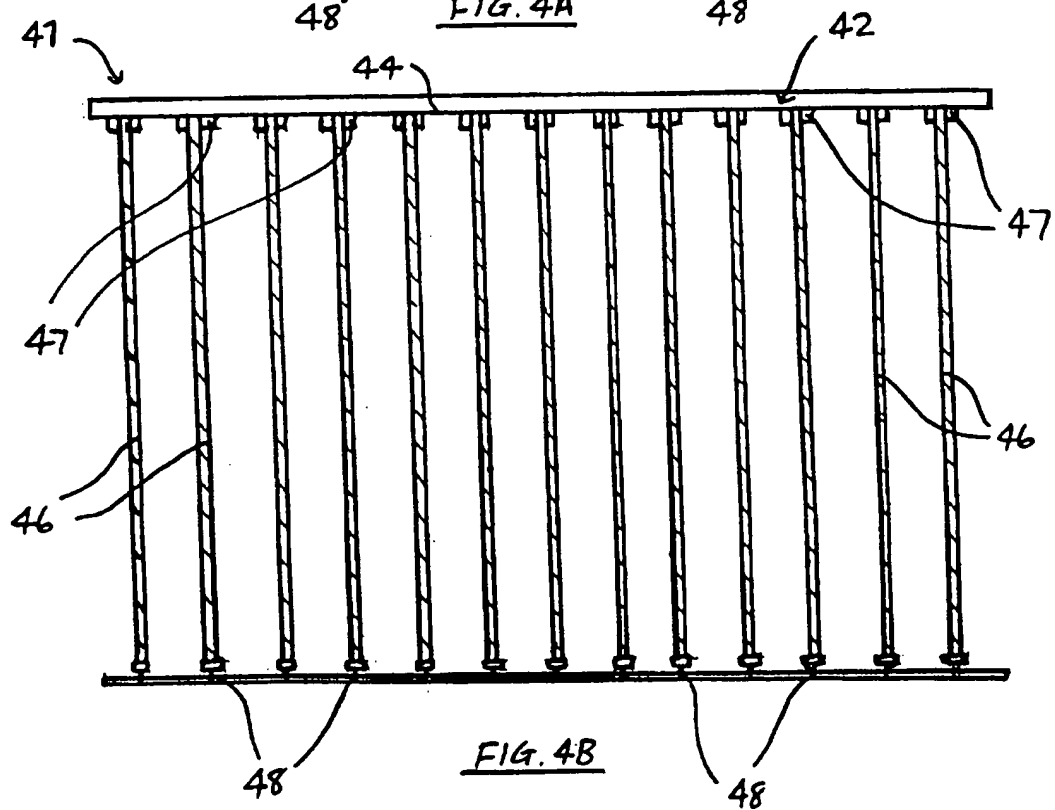
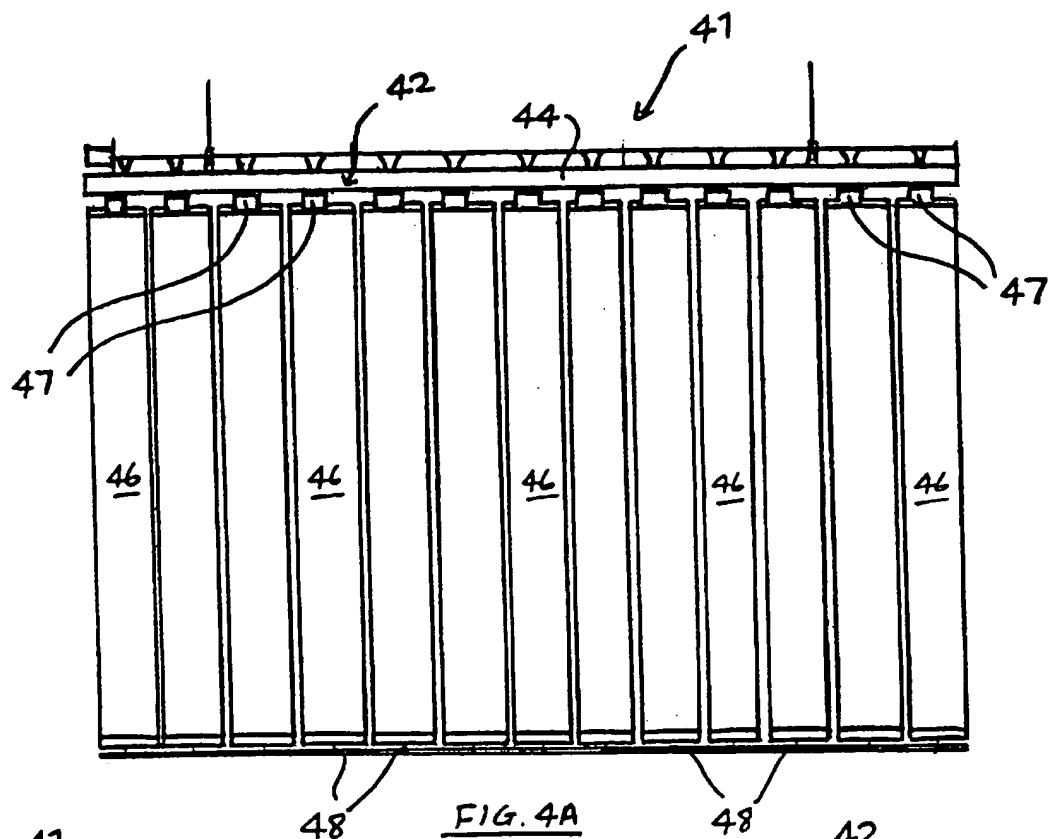
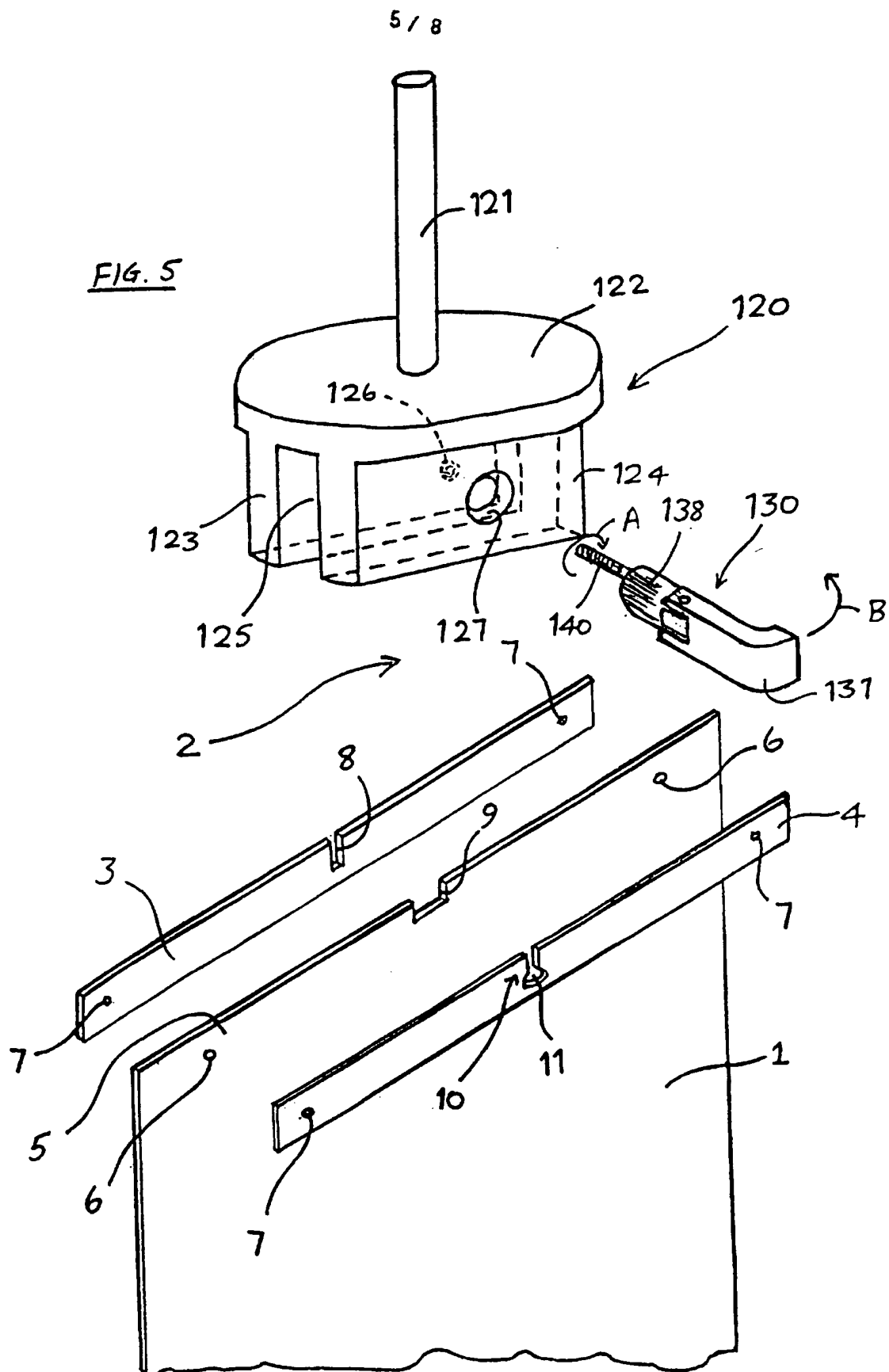
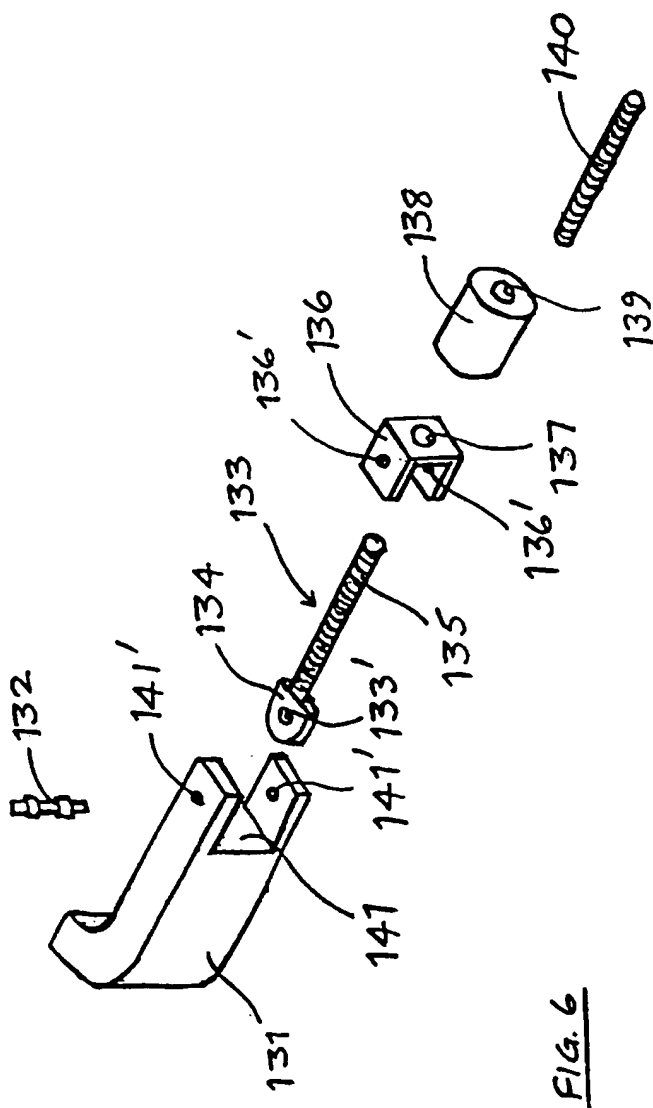


FIG. 3

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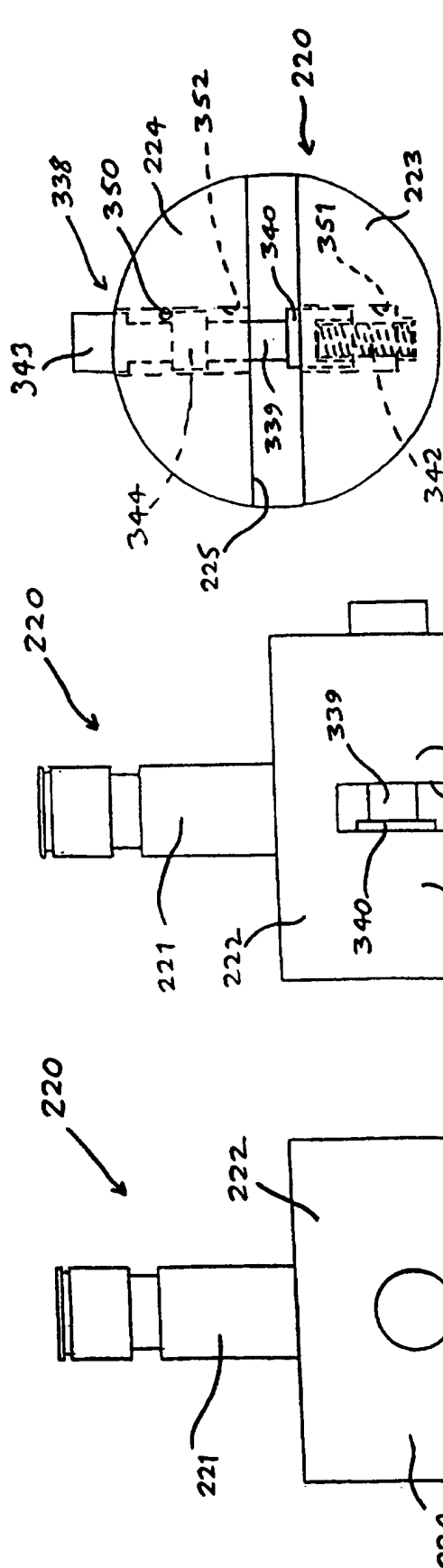


FIG. 7C

FIG. 7B

FIG. 7A

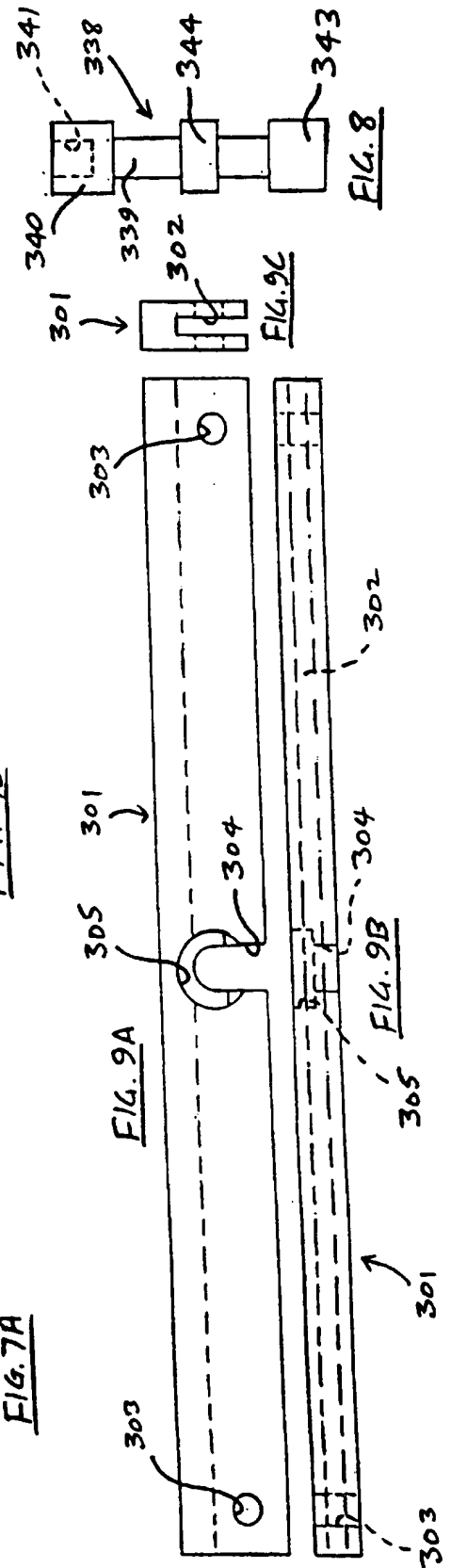
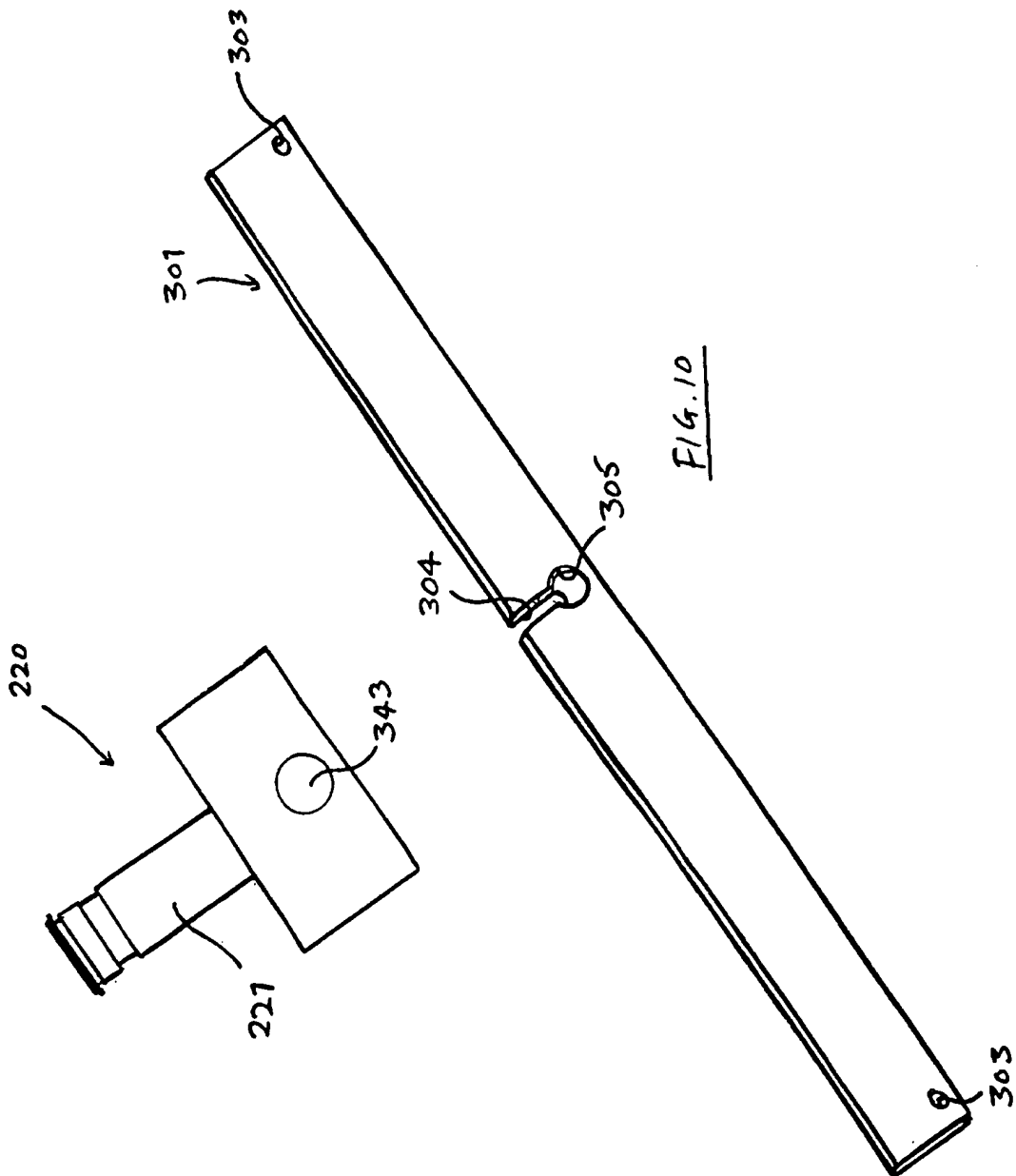


FIG. 8

FIG. 9C

FIG. 9A

FIG. 9B



INTERNATIONAL SEARCH REPORT

National Application No

PCT/GB 96/02974

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 G09F11/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 G09F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	US 5 022 172 A (KAWAHARA ET AL.) 11 June 1991 see column 6, line 17 - column 7, line 61; figures 2-5,21,23 ---	1-13,15, 45
A	DE 89 00 124 U (REMMERS) 30 March 1989 see page 4, line 9 - page 5, line 25; figures 1,2 --- -/--	1-11,13, 45,47,48

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

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- *O* document referring to an oral disclosure, use, exhibition or other means
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Date of the actual completion of the international search

21 March 1997

Date of mailing of the international search report

- 4. 04. 97

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Authorized officer

Taylor, P

INTERNATIONAL SEARCH REPORT

National Application No
PCT/GB 96/02974

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national Application No

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